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Sympathectomy in the Goat.

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(Introduced by W. E. Sullivan.)

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Interest in the relation between the sympathetic nervous system and the striated limb musculature was revived by the experiments of Hunter and Royle.[1] They described a loss of plastic tonus in the hind limb of the goat and in the wing of the fowl following the severence of the sympathetic connections to these parts. By the loss of plastic tonus they meant the loss of an intrinsic muscular supporting mechanism controlled by the sympathetic nervous system which functioned to maintain the position of the limb after the ordinary somatically innervated fibers had ceased contracting. Later experiments by other workers who used the dog and cat chiefly, failed to confirm these observations. We are reporting the results of unilateral right or left lumbar sympathectomy performed on 7 young normal goats.

Our general procedure was (1) examination of the normal animal, (2) left or right lumbar sympathectomy, (3) comparison of normal and operated sides following sympathectomy, (4) decerebration, (5) comparison of normal and sympathectomized limb during decerebrate rigidity.

The chief purpose of the normal examination was to elicit any evidences of right or left leggedness. We observed the movements of walking, running, and jumping and also examined the postural reflexes as they have been described by Magnus.[2] This is done by placing the animal on its back in a cradle and noting the changes in the position and tone of the limbs after rotation of the head on the neck. The results of the normal examination indicated (1) right-leggedness in one animal which persisted throughout the subsequent procedures, (2) the postural reflexes in the normal goat are identical to those in the animals Magnus has worked with.

We found the lateral retro peritoneal approach to the lumbar chain to be the most satisfactory. Autopsy indicated that we succeeded in removing the 2nd to the 5th, inclusive, lumbar ganglia in the majority of instances. The wounds healed readily; the recovery from this procedure was uneventful.

Within 5 to 15 minutes after the chain had been divided there

[1] Hunter, J. I., *Med. J. Australia*, 1924, lxxxvi.

[2] Magnus, R., *Körperstellung*, 1924.

was a palpable difference in temperature between the normal and the operated side; the operated side felt distinctly warmer. We did not follow the blood vessel changes closely but we incidentally noted this change in temperature 47 days after operation in one animal. Ten days to 2 weeks after sympathectomy we repeated the procedure of the normal examination and recorded the latent period of the knee reflex. By these methods we were unable to find any constant differences between the normal and the operated sides. Slight differences in position and tonus between the 2 sides would on one occasion indicate a decrease in tone on the operated side and during a repeated examination the same limb would often show a slight increase in tone. The position of the animal is a very important factor and we feel that the changes in tonus we observed could be explained by deviation from the standard midline position. The majority of the reflexes indicate a slight increase in the latent period following sympathectomy but the difference was slight, variable and not outside the limits of the experimental error.

Decerebration was accomplished by removal of the posterior part of the bony vault and cerebral hemisphere. The midbrain was exposed and sectioned with a blunt dissector just posterior to the superior colliculus. We are very grateful to Drs. Gale and Hinsey and to Mr. William Kaplan for their help with this procedure. Five of the 7 animals were decerebrated successfully.

About 20 minutes after the section was made the wink and knee reflexes returned; the breathing and pulse rate became regular and steady and we considered the animal ready for study. Again we were unable to demonstrate any constant differences between the normal and sympathectomized limb by the methods already referred to. In some animals there was a temporary difference in the degree of rigidity which at first seemed significant but which later proved to be due to the fact that the animal had been lying on the affected side during the operation. Occasionally we observed changes in tone while the animal was in a certain position and then found by changing the position the difference in the tone disappeared. The postural reflexes are present and unaltered by decerebration; the latent period of the knee reflex showed no change following decerebration. We roughly measured the degree of rigidity by suspending the animal in a frame and resting the limb on a kitchen scale following the method of Ranson and Hinsey.[3] By this method of measurement the degree of rigidity seemed to be unaltered by the previous sympathectomy.

[3] Ranson, S. W., and Hinsey, J. C., *J. Comp. Neur.*, 1926, xlii, 69.

As a result of our experiment we are unable to demonstrate any changes in tone in the hind limb of the goat following the removal of the 2nd to the 5th lumbar sympathetic ganglia.

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Transplantation of Placental Tissue.

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Frankl,[1] using mice, showed that "a successful transplantation of a placenta (fetal portion) on a pregnant animal causes persistence of colostrum secretion" beyond the normal period following the birth of the young. Unless the transplants were removed the litters born to engrafted mothers died "evidently from starvation." Stimson[2] and others report in women with retained placenta, suppression of the secretion of true milk. Our first attempts, without knowledge of these results, were made to obtain living grafts of the fetal or trophoblastic portion of rabbit and rat placentae. In all cases neither gross nor microscopic examination gave evidence of growth after implantation. Since Frankl's results have been used in interpretating the relation of the placental hormones to lactation, and because our experiments, which extended over a period of about a year, have been discontinued, it seems desirable to report our work briefly.

We used trophoblastic tissue (fetal placenta) from rabbits varying in stages of pregnancy from 2 weeks to near full-term, and from rats during mid and later pregnancy. Thin slices of tissue were implanted subcutaneously and intramuscularly, and intraperitoneally in both rats and rabbits. Emulsions of placental cells in Locke's solution were injected into the ear vein of rabbits, and subcutaneously, intramuscularly, and intraperitoneally into both rabbits and rats. Host animals have been, the female from whom the tissues were taken, other females both young and mature, males, and in the case of the rat, also young, about one-fourth grown. Extirpation and implantation in the case of both rabbits and rats was done aseptically under chloral-urethane anesthesia administered by stomach-tube and supplemented by ether. Animals were killed and

[1] Frankl, Oskar, *Am. J. Obstet. and Gynec.*, 1923, vi, 399.

[2] Stimson, C. M., *Am. J. Obstet. and Gynec.*, 1922, iv, 413.